## A. INTRODUCTION

This section identifies and quantifies all the significant direct and indirect air quality impacts of the proposed actions in Downtown Brooklyn. As described in detail in Chapter 1, "Project Description," the Downtown Brooklyn Development calls for the rezoning and other land use actions to stimulate the development of mixed-use, academic, cultural, residential, and retail uses. Direct effects stem from emissions generated by stationary sources, such as emissions from fuel burned at the projected development sites for heating, ventilation, and air conditioning (HVAC) systems. Indirect effects are caused by emissions from motor vehicles traveling to and from the projected development sites (mobile sources) after completion. In addition, potential effects of stationary source emissions from existing industrial facilities on nearby proposed residential uses are assessed.

The results discussed below show that the maximum predicted carbon monoxide (CO), and particulate matter ($PM_{10}$ and $PM_{2.5}$) concentrations from mobile sources would be less than the corresponding ambient air standards, with the development of the projected development sites under the proposed actions. The cumulative parking garage analysis also determined that the project's public parking facilities would not result in any significant adverse air quality impacts. Thus, the proposed actions would not have significant adverse impacts from mobile source emissions.

A stationary source screening analysis and subsequent detailed dispersion modeling determined that there would be no potential significant adverse air quality impacts from emission of nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$) and $PM_{10}$, from the proposed HVAC systems of the projected development sites. With respect to $PM_{2.5}$,an (E) designation has been placed on projected development site BB (Block 165, Lot 29), which stipulates that any new residential and/or commercial development on the above-referenced property must ensure that the heating, ventilating, and air conditioning stack(s) is located at least 115 feet from the lot line facing Hoyt Street and parallel with Schermerhorn Street, to avoid any potential significant air quality impacts. In addition, there would be no significant adverse air quality impacts from industrial facilities on the proposed developments sites.

## B. POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Typically, ambient concentrations of CO and lead are predominantly influenced by mobile source emissions. Emissions of nitrogen oxides (NO and $NO_2$, collectively referred to as $NO_x$) come from both mobile and stationary sources. Emissions of sulfur dioxide ($SO_2$) are associated mainly with stationary sources, but diesel-powered vehicles, primarily heavy-duty trucks and buses, also contribute. Particulate matter (PM) is emitted from both stationary and mobile sources. Fine

particulate matter is also formed when emissions of $NO_x$, sulfur oxides ($SO_x$), ammonia, organic compounds, and other gases react in the atmosphere. Ozone is formed in the atmosphere by a complex photochemical processes that include $NO_x$ and volatile organic compounds (VOCs), emitted mainly from industrial processes and mobile sources.

## CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In New York City, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections along heavily traveled and congested roadways. Consequently, CO concentrations must be predicted on a localized or microscale basis. The proposed actions would increase traffic volumes on streets within and surrounding the rezoning area and could result in localized increases in CO levels. Therefore, a mobile source analysis was conducted to evaluate future CO concentrations with and without the proposed actions.

## NITROGEN OXIDES AND VOLATILE ORGANIC COMPOUNDS

Nitrogen oxides and volatile organic compounds are of principal concern because of their role as precursors in the formation of ozone. The standard for average annual $NO_2$ concentrations is normally applied only for fossil fuel energy sources. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are diffusing downwind, ozone concentrations are often increased many miles from the sources of the precursor pollutants. The effects of $NO_x$ emissions from mobile sources are therefore generally examined on a regional basis. The change in regional mobile source emissions of these pollutants is related to the total number of vehicle trips and the vehicle miles traveled throughout the New York metropolitan area. The proposed actions would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, it would not have any measurable impact on regional $NO_x$ emissions or on ozone levels. An analysis of project-related impacts from mobile sources for these pollutants was therefore not warranted. Potential impacts from fuel to be burned for the proposed actions' HVAC systems were evaluated.

## LEAD

Lead emissions are principally associated with industrial sources and motor vehicles that use gasoline-containing lead additives. Most U.S. vehicles produced since 1975, and all vehicles produced after 1980, are designed to use unleaded fuel. As these newer vehicles have replaced older ones, motor-vehicle-related lead emissions have decreased. As a result, ambient concentrations of lead have declined significantly. Nationally, the average measured atmospheric lead level in 1985 was only about one quarter the level in 1975.

In 1985, the EPA announced new rules drastically reducing the amount of lead permitted in leaded gasoline. Monitored concentrations of lead indicate that this action has been effective in significantly reducing atmospheric lead levels. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the national standard of 1.5 micrograms per cubic meter (3-month average). No significant sources of lead are associated with the proposed actions. Therefore, no analysis for this pollutant was warranted.

### RESPIRABLE PARTICULATE MATTER—$PM_{10}$ AND $PM_{2.5}$

Particulate matter is emitted into the atmosphere from a variety of sources: industrial facilities, power plants, construction activity, and other smaller sources, as well as some natural sources. Gasoline-powered vehicles emit relatively small quantities of particles. Exhaust emitted from diesel-powered vehicles, especially heavy trucks and buses, contain large quantities of particles, and therefore respirable particulate matter concentrations may be locally elevated near roadways with high volumes of such vehicles (e.g., in the vicinity of bus depots or truck marshaling yards). Particulate matter less than 10 μm in diameter (both $PM_{10}$ and $PM_{2.5}$) has become of primary concern because it is respirable.

An analysis was conducted to assess the worst-case $PM_{10}$ impacts due to the increased traffic associated with the proposed project. $PM_{10}$ impacts associated with the project's potential HVAC emissions were also analyzed. In addition, the potential effects of $PM_{2.5}$ emissions from the project-generated incremental diesel trucks on ambient levels in the project study area was assessed at the locations where the greatest potential for project-related increases in concentrations could occur.

### SULFUR DIOXIDE—$SO_2$

$SO_2$ emissions are primarily associated with the combustion of sulfur-containing fuels: oil and coal. No significant quantities are emitted from mobile sources. Monitored $SO_2$ concentrations in New York City are below the national standards. Vehicular sources of $SO_2$ are not significant and therefore, an analysis of this pollutant from mobile sources was not warranted. As part of the proposed project, both natural gas and fuel could be burned. Therefore, potential future levels of $SO_2$ from HVAC systems were examined.

## C. AIR QUALITY STANDARDS

### NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act and its amendments, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, $NO_2$, ozone, particulate matter (both $PM_{2.5}$ and $PM_{10}$), $SO_2$, and lead. Hydrocarbon standards have been rescinded because these pollutants are primarily of concern in their role as ozone precursors. In addition to retaining the $PM_{10}$ standards, the U.S. Environmental Protection Agency (EPA) adopted 24-hour and annual standards for $PM_{2.5}$, which became effective September 16, 1997. It is expected to be several years before EPA releases recommended methods to assess $PM_{2.5}$ concentrations.

Table 16-1 shows the standards for these pollutants. These standards have also been adopted as the ambient air quality standards for the State of New York. The primary standards protect public health, and represent levels at which there are no known significant effects on human health. The secondary standards are intended to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. For $NO_2$, ozone, and particulate matter, the primary and secondary standards are the same.

**Table 16-1**
**National and New York State Ambient Air Quality Standards**

| Pollutant | Primary | | Secondary | |
|---|---|---|---|---|
| | ppm | µg/m³ | ppm | µg/m³ |
| **Carbon Monoxide (CO)** | | | | |
| Maximum 8-Hour Concentration[1] | 9 | (10,000) | None | |
| Maximum 1-Hour Concentration[1] | 35 | (40,000) | | |
| **Lead** | | | | |
| Maximum Arithmetic Mean Averaged Over 3 Consecutive Months | NA | 1.5 | None | |
| **Nitrogen Dioxide ($NO_2$)** | | | | |
| Annual Arithmetic Average | 0.053 | (100) | 0.053 | (100) |
| **Ozone** | | | | |
| 1-Hour Average[2] | 0.12 | (235) | 0.12 | (235) |
| 8-Hour Average[3] | 0.08 | (157) | 0.08 | (157) |
| **Total Suspended Particles (TSP)[4]** | | | | |
| Annual Mean | NA | 75 | NA | |
| Maximum 24-Hour Concentration | NA | 250 | | |
| **Respirable Particulate Matter ($PM_{10}$)** | | | | |
| Annual Arithmetic Mean | NA | 50 | NA | 50 |
| Maximum 24-Hour Concentration[1] | NA | 150 | NA | 150 |
| **Fine Respirable Particulate Matter ($PM_{2.5}$)** | | | | |
| Most Recent 3-Year Arithmetic Mean | NA | 15 | NA | 15 |
| Maximum 24-Hour Concentration[5] | NA | 65 | NA | 65 |
| **Sulfur Dioxide ($SO_2$)** | | | | |
| Annual Arithmetic Mean | 0.030 | (80) | NA | NA |
| Maximum 24-Hour Concentration[1] | 0.14 | (365) | NA | NA |
| Maximum 3-Hour Concentration[1] | NA | NA | 0.50 | (1,300) |

**Notes:**
[1] Not to be exceeded more than once a year.
[2] Applies only to areas designated as non-attainment.
[3] Three-year average of the annual fourth highest daily maximum 8-hr average concentration.
[4] TSP levels are regulated by a New York State Standard only.
[5] Not to be exceeded by the 98th percentile of 24-hour $PM_{2.5}$ concentrations in a year (averaged over 3 years).

Parenthetical values are approximately equivalent concentrations.
ppm – parts per million; µg/m³ – micrograms per cubic meter; NA – not applicable
**Sources:** 40 CFR Part 50—National Primary and Secondary Ambient Air Quality Standards, 6 NYCRR Part 257—Air Quality Standards.

## STATE IMPLEMENTATION PLAN (SIP)

The Clean Air Act requires each state to submit to EPA a State Implementation Plan (SIP) for attainment of the NAAQS. The 1977 and 1990 amendments require comprehensive plan revisions for areas where one or more of the standards have yet to be attained. All of New York City is designated non-attainment for ozone. Nassau, Rockland, Suffolk, Westchester and the five counties of New York City have been designated as severe non-attainment for ozone 1-hour standard. In November 1998, New York State submitted its Phase II Alternative Attainment Demonstration for Ozone, which addressed attainment of the one-hour ozone NAAQS by 2007,

and has recently submitted revisions to the SIP. These SIP revisions included additional emission reductions that EPA requested to demonstrate attainment of the standard and to update the SIP estimates using a new EPA model to predict mobile source emissions—MOBILE6. On April 15, 2004 EPA designated these same counties as moderate non-attainment for the new 8-hour ozone standard (effective June 15, 2004). EPA will revoke the 1-hour standard in June, 2005, however the very specific control measures for the 1-hour standard included in the SIP will be required to stay in place until the 8-hour standard is attained. The discretionary emissions reductions in the SIP would also remain but could be revised or dropped based on modeling. A new SIP for ozone will be adopted by the state no later than June 15, 2007, with a target attainment deadline of June 15, 2010.

EPA has recently re-designated New York City from non-attainment to attainment for CO. The Clean Air Act Amendments require a maintenance plan for former non-attainment areas to ensure continued compliance of the CO NAAQS. New York City is also committed to implementing area-wide and site-specific control measures to reduce CO levels, should unanticipated localized growth result in elevated CO levels in the maintenance period.

EPA has designated New York County (Manhattan) non-attainment for respirable particulate matter ($PM_{10}$). In 1995, a SIP revision and Attainment Demonstration was submitted to EPA for the control of $PM_{10}$ concentrations in New York County. Kings County has been designated as attainment for $PM_{10}$. On February 13, 2004 New York State formally recommended that EPA designate the five counties of New York City Metropolitan Area as non-attainment for $PM_{2.5}$; by December 31, 2004, EPA will finalize the designations. Once non-attainment designations take effect, the state and local governments have three years to develop implementation plans designed to meet the standards.

## CITY ENVIRONMENTAL QUALITY REVIEW (CEQR) IMPACT CRITERIA

For all pollutants, exceeding the NAAQS generally constitutes a significant impact. In addition to the NAAQS, New York City has developed *de minimis* criteria to assess the significance of impacts on air quality that would result from a proposed development. These criteria, as detailed in the *City Environmental Quality Review* (CEQR) *Technical Manual*, set the minimum change in CO concentration that defines a significant environmental impact. Significant increases with respect to CO concentrations in New York City are defined as: (1) an increase of 0.5 parts per million (ppm) or more in the maximum 8-hour average CO concentration at a location where the predicted No Build 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline concentrations and the 8-hour standard, when no build concentrations are below 8 ppm. The *CEQR Technical Manual* guidelines indicate that an impact analysis for CO is not required if the peak number of project-generated vehicles is less than 50 per hour for the study area.

## $PM_{2.5}$ INTERIM GUIDANCE CRITERIA

At this time, EPA has not yet formally determined if the measured $PM_{2.5}$ levels in New York City indicate whether the City (or counties within the City) will be designated as either attainment or non-attainment with respect to the $PM_{2.5}$ ambient air quality standards.

The New York City Department of Environmental Protection (DEP) is currently employing interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts from projects under CEQR. The interim guidance criteria for determining the potential for significant adverse impacts from $PM_{2.5}$ are as follows:

- Predicted incremental impacts of $PM_{2.5}$ greater than 5 $\mu g/m^3$ averaged over a 24-hour (daily) period at a discrete location of public access, either at ground or elevated levels (microscale analysis); and
- Predicted incremental ground-level impacts of $PM_{2.5}$ greater than 0.1 $\mu g/m^3$ on an annual average neighborhood-scale basis (A neighborhood scale concentration represents the average concentration over an area of approximately one square kilometer centered on the location where the maximum impact is predicted, or in the case of mobile sources, concentrations at a distance from the roadway similar to that used for the placement of neighborhood-scale ambient monitoring stations.)

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts.[1] This policy would apply to facilities applying for permits or major permit modifications under the State Environmental Quality Review Act (SEQRA) that emit 15 tons of $PM_{10}$ or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum predicted impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

The projected developments' maximum potential to emit for $PM_{2.5}$ is well below 15 tons per year. In addition, the policy is intended for evaluating NYSDEC air permit applications for projects subject to SEQRA; nevertheless, it was also used as guidance criteria for the purpose of evaluating stationary source $PM_{2.5}$ impacts.

Actions that would result in predicted incremental $PM_{2.5}$ impacts greater than the interim guidance criteria above are considered to result in potential significant adverse impacts. Actions subject to CEQR that fail such criteria (until they are modified) would require the preparation of an examination of potential measures to reduce or eliminate such potential significant adverse impacts.

## D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

### MOBILE SOURCES

*CO AND $PM_{10}$*

The prediction of motor-vehicle-generated CO and $PM_{10}$ concentrations in an urban environment is characterized by meteorological phenomena, traffic conditions, and physical configurations. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and geometry combine to affect pollutant concentrations. The mathematical expressions and formulations contained in the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions and it is necessary to predict the reasonable

[1] *Assessing and Mitigating Impacts of Fine Particulate Matter Emissions* (NYSDEC, December 2003).

worst-case condition, most of these dispersion models predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The CO and $PM_{10}$ analyses for the proposed actions employs a modeling approach approved by EPA that has been widely used for evaluating air quality impacts of projects in New York City, New York State and throughout the country. The modeling approach includes a series of conservative assumptions relating to meteorology, traffic, and background concentration levels resulting in a conservatively high estimate of expected CO and $PM_{10}$ concentrations that could ensue from the proposed actions.

*Dispersion Model for Microscale Analyses*

To determine motor-vehicle-generated CO concentrations adjacent to streets near the proposed project sites, the CAL3QHC model was applied. Maximum 1- and 8-hour CO concentrations were determined using EPA's CAL3QHC model Version 2.0[1]. The CAL3QHC model is based on the CALINE3 line source dispersion model, with an additional algorithm for estimating vehicular queue lengths at signalized intersections. The CALINE3 model employs a Gaussian (normal distribution) dispersion assumption. CAL3QHC predicts the dispersion of CO emissions from idling vehicles and moving vehicles. The queuing algorithm includes site-specific traffic parameters, such as signal timing and delay calculations (from the 2000 *Highway Capacity Manual* traffic forecasting model), saturation flow rate, vehicle arrival type and signal actuation (i.e., pre-timed or actuated signal) characteristics to accurately predict the number of idling vehicles. The CAL3QHC model has been updated with an extended module, CAL3QHCR, which allows for the incorporation of hourly meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters. This refined version of the model, CAL3QHCR, is employed if maximum predicted future CO concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first-level CAL3QHC modeling. CAL3QHCR was used for modeling $PM_{10}$ since the impacts are assessed on a 24-hour and annual basis.

*Meteorology*

*CAL3QHC*. In general, the transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind direction, wind speed, and atmospheric stability. Wind direction influences the accumulation of pollutants at a particular receptor location. Wind direction was chosen to maximize pollutant concentrations at each of the prediction sites. In applying the CAL3QHC model, the wind angle was varied to determine the worst-case wind direction resulting in the maximum concentrations.

Following the recommendations of EPA in the *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*[2], CO computations were performed using a wind speed of 1 meter per second, and stability class D. A neutral stability class was employed, and a persistence factor of 0.70 for the 8-hour period was selected. A surface roughness of 3.21 meters was chosen, and, in addition, a 43° Fahrenheit ambient temperature was assumed for the emissions computations. At

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[1] *User's Guide to CAL3QHC, A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, Office of Air Quality, Planning Standards, EPA, Research Triangle Park, North Carolina, Publication EPA-454/R-92-006.

[2] *Guidelines for Modeling Carbon Monoxide From Roadway Intersections*, EPA Office of Air Quality Planning and Standards, Publication EPA-454/R-92-005.

each receptor location, the wind angle that maximized the pollutant concentrations was used in the analysis regardless of frequency of occurrence. These assumptions ensured that worst-case meteorology was used to estimate impacts.

*CAL3QHCR.* The CAL3QHCR uses hourly meteorological data. A 5-year meteorological data set for the dispersion modeling was used. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period 1997-2001. This meteorological data provides hour-by-hour wind speeds, directions, and atmospheric stability.

*Analysis Year*

The CO and $PM_{10}$ microscale analyses were performed for 2013, the year by which the proposed future projected sites are likely to be completed. The future analysis was performed both without the proposed actions (the No Build condition) and with the proposed actions (the Build condition).

*Vehicle Emissions Data*

To predict ambient concentrations of pollutants generated by vehicular traffic, emissions from vehicle exhaust systems must be estimated accurately. Vehicular CO and $PM_{10}$ emissions were computed using the EPA-developed mobile source emissions model, MOBILE6.2. This is the most current, recently released emissions model capable of calculating engine emission factors for various vehicle types, based on the fuel (gas, diesel, or alternative technologies), meteorological conditions, vehicle speeds, roadway types, number of starts per day and engine soak time, and various other factors that influence emissions, such as inspection maintenance programs.

Vehicle classification data were based on field studies and data obtained from other traffic studies. Emission estimates were based on guidance from NYSDEC on the appropriate credits to be used in the MOBILE6.2 model to accurately reflect the inspection and maintenance program. The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from the vehicles' exhaust systems are below emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

Based on the latest guidance from NYSDEC, sport utility vehicles (SUVs) were classified as light-duty gasoline powered trucks, with operating conditions (starts per day and soak time) and registration characteristics (age of vehicles and mileage accumulation) set to be the same as for light-duty vehicles (LDV), in order to properly model their emissions. Taxis are assumed to all be in hot stabilized mode (excluding any start emissions). The general categories of vehicle types for specific roadways were further categorized into subcategories based on their relative fleet-wide breakdown[1].

An ambient temperature of 52.5° Fahrenheit was used. This temperature, calculated based on the latest guidance from EPA and NYSDEC, represents the average temperature measured at the

[1] The MOBILE6.2 emissions model utilizes 28 vehicle categories by size and fuel. Traffic counts and predictions are based on broader size categories, and then broken down according to the fleet-wide distribution of subcategories and fuel types (diesel, gasoline, or alternative).

Central Park meteorological station during the 10 highest 8-hour CO events measured at the East 34th Street NYSDEC monitoring station in 2000 through 2002.

Since the contribution of re-entrained road dust to $PM_{10}$ concentrations as presented in the $PM_{10}$ SIP is considered to be significant, the $PM_{10}$ estimates include both exhaust and road dust. Road dust emission factors were calculated according to the latest procedure delineated by EPA[1].

*Traffic Data*

Traffic data for the air quality analysis were derived from existing traffic counts, projected future growth in traffic, *NYSDOT's Highway Sufficiency Ratings 1999,* and other information developed as part of the traffic analysis for the proposed actions. Traffic data for the future without and with the proposed actions were employed in the respective air quality modeling scenarios. The weekday AM (8 to 9 AM) and PM (5 to 6 PM) peak periods were subjected to microscale analysis. These time periods were selected for the mobile source analysis because they produce the maximum anticipated project-generated traffic and therefore have the greatest potential for significant air quality impacts.

For $PM_{10}$, the peak AM and PM period traffic volumes were used as a baseline; traffic volumes for other hours due to No Build traffic and the project were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected for the project. 24-hour $PM_{10}$ impacts were determined by using the 24-hour distribution associated with the highest total daily vehicle count; for annual impacts, average weekday and weekend 24-hour distributions were used to more accurately simulate traffic patterns over longer periods.

*Background Concentrations*

Background concentrations are those pollutant concentrations not directly accounted for through the modeling analysis, which directly accounts for vehicle-generated emissions on the streets within 1,000 feet and line-of-sight of the receptor location. Background concentrations must be added to modeling results to obtain total pollutant concentrations at a study site.

The 8-hour average background concentration used in this analysis was 2.3 ppm for the 2013 predictions. This value, obtained from DEP, is based on CO concentrations measured at NYSDEC monitoring stations and is adjusted to reflect the reduced vehicular emissions expected in the analysis year. For purposes of this adjustment, based on EPA guidance, it was assumed that 20 percent of the background value is caused by stationary source emissions that have remained relatively unchanged with time and that 80 percent of the background value is caused by mobile sources that decrease with time. This decrease reflects the increasing numbers of federally-mandated lower-emission vehicles that are projected to enter the vehicle fleet as older, higher-polluting vehicles are retired (i.e., vehicle turnover), and the continuing benefits of the New York State inspection and maintenance program.

The $PM_{10}$ annual and 24-hour background concentrations are based on the highest and highest second-highest concentrations, respectively measured over the most recent three year period at the nearest NYSDEC monitoring site. For the project, the background concentrations for the annual and 24-hour periods are 22 $\mu g/m^3$ and 49 $\mu g/m^3$, respectively.

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[1] EPA, "Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources", Draft Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42/, August 2003.

*Mobile Source Receptor Locations*

Five receptor locations were selected for CO microscale analysis (see Table 16-2 and Figure 16-1). The receptor sites are computer simulations of sidewalk or roadside locations near intersections with continuous public access. Multiple receptor sites were modeled at each of these intersections (i.e., receptors were placed along the approach and departure links at spaced intervals). These receptor locations were selected because they are the locations in the study area where the largest levels of project-generated traffic are expected, and therefore where the greatest air quality impacts and maximum changes in the CO concentrations would be expected.

**Table 16-2**
**Mobile Source Receptor Locations**

| Receptor Site | Location |
|---|---|
| 1 | Tillary Street and Flatbush Avenue |
| 2 | Myrtle Avenue and Flatbush Avenue |
| 3 | Willoughby Street and Gold Street |
| 4 | Livingston Street and Hoyt Street |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. |

For the $PM_{10}$ analysis, a single intersection was chosen. Based on review of existing traffic volumes and estimated project-generated traffic, the intersection at Atlantic Avenue/Flatbush Avenue/4th Avenue was selected since it has the highest Build traffic volumes and would therefore result in the highest predicted $PM_{10}$ impacts.

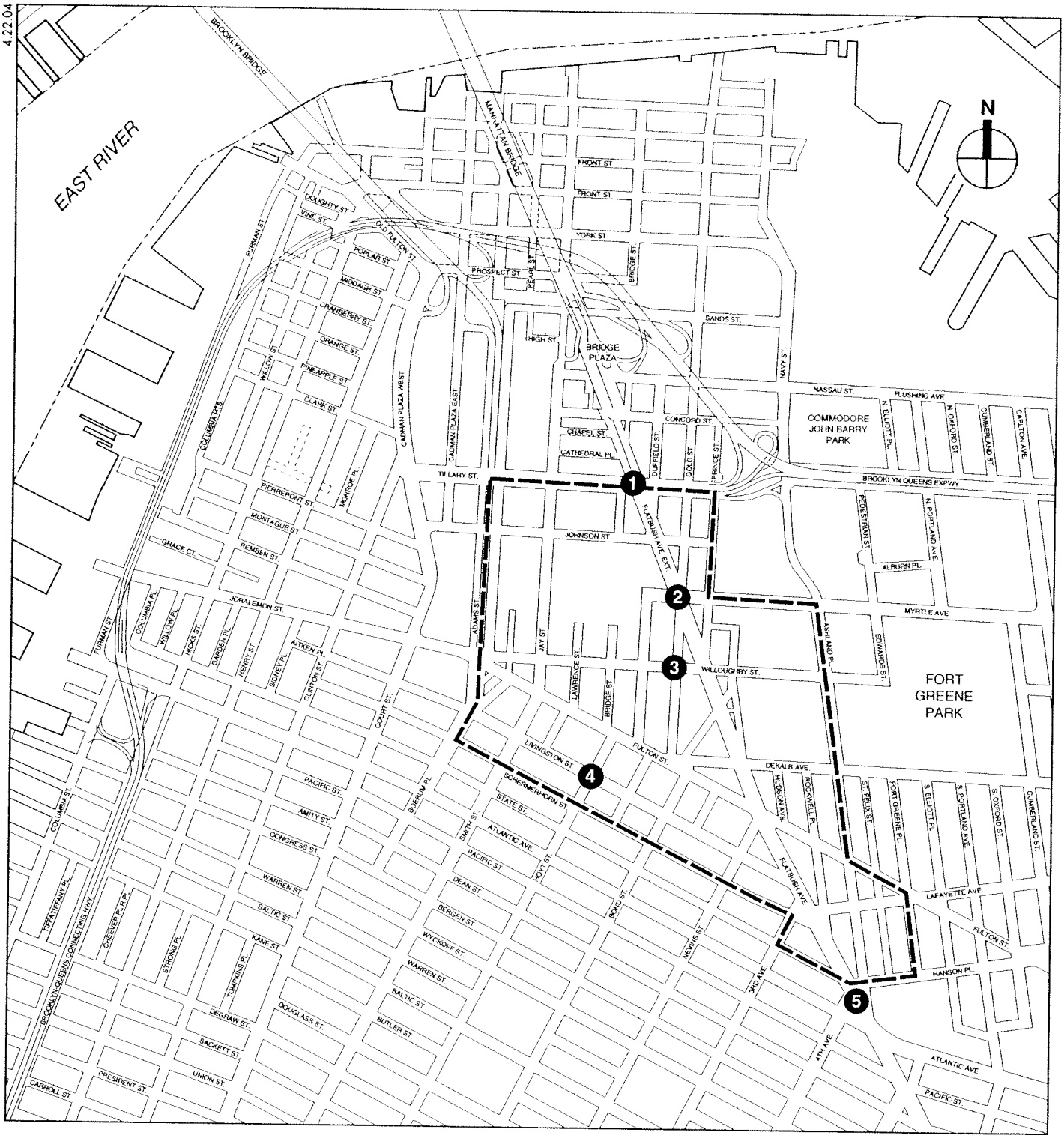
*$PM_{2.5}$*

The assessment of potential on-street $PM_{2.5}$ impacts from mobile sources followed the general methodology for assessing $PM_{10}$ impacts. Analysis of the anticipated $PM_{2.5}$ mobile source air quality impacts associated with the proposed actions was performed for the year 2013. Although there is currently no official guidance for modeling $PM_{2.5}$ impacts from mobile sources, the methodology described below was developed based on existing EPA approved methods for other mobile source modeling that are discussed in the *CEQR Technical Manual*, EPA documents regarding $PM_{2.5}$ (including EPA $PM_{2.5}$ monitoring station location guidance[1]) and the working guidance currently still under development by NYSDEC. The general approach is to determine the maximum predicted concentrations that would represent both local maximum and neighborhood-scale increases in $PM_{2.5}$ concentrations (as would be measured by monitoring stations—the same levels that were used to determine the health based NAAQS for $PM_{2.5}$). A summary of the $PM_{2.5}$ mobile sources impact assessment methodology is provided below.

*Dispersion Models for Microscale Analysis*

The CAL3QHCR model was used to predict the dispersion of $PM_{2.5}$ emitted at the chosen site. Analyses were performed using hourly traffic and meteorological data in order to estimate maximum 24-hour and annual average concentrations, following the general methodology recommended for localized mobile source modeling of $PM_{10}$, as described in the *CEQR Technical Manual* (see Section B, "Methodology for Predicting Pollutant Concentrations from

[1] *Guidance for Network Design and Optimum Site Exposure for $PM_{2.5}$ and $PM_{10}$*, EPA-454/R-99-022.




DOWNTOWN**BROOKLYN**DEVELOPMENT

## Air Quality Receptor Locations

Figure 16-1

Mobile Sources," above). Hourly meteorological data measured at the LaGuardia Airport station during the years 1997 through 2001 were employed in this analysis.

*Mobile Source Receptor Locations*

One site was chosen for the $PM_{2.5}$ mobile source impact analyses: the intersection of Willoughby Street/Gold Street (Site 3). This site was the location where the greatest potential for project-generated increases in incremental and diverted diesel trucks were projected to occur. Impacts were modeled at this location based on the predicted traffic volumes and patterns forecast for the year 2013.

Receptors for the annual neighborhood-scale analysis were placed at a distance from the roadway similar to the distances defined for the placement of neighborhood scale monitoring stations in the above-mentioned EPA guidance. Receptors were located at a distance of 15 meters (49 feet) from the curb in all modeled roadways and at 7.6 meter (25 feet) intervals along all roadways. For the localized $PM_{2.5}$ analysis, the 24-hour average microscale model was run with the same receptor placement adjacent to roadways that were used in the CO mobile source modeling analysis.

*Vehicle Emissions Data*

Estimates of on-street traffic are employed with emission factors to yield the total emissions used as input for the $PM_{2.5}$ on-street mobile source dispersion modeling. Emission estimates for $PM_{2.5}$ were determined using MOBILE6.2, and reflected the latest guidance from NYSDEC on the appropriate inspection and maintenance program credits and fuels programs. Hourly traffic data for the analyses were derived from traffic information developed as part of the 2013 CO impact analysis.

In accordance with the DEP $PM_{2.5}$ interim guidance criteria, emission rates were determined with fugitive road dust to account for their impacts on receptors near roadways (i.e., CO analysis receptor locations.) Fugitive road dust may not be included in future microscale analyses based on EPA's recent proposed rule-making for assessing impacts of $PM_{2.5}$. However, to be conservative, fugitive road dust was included in the localized $PM_{2.5}$ microscale analysis.

## PARKING

The proposed actions would include parking facilities to account for the new parking demand and supply. Emissions from vehicles using the parking areas could potentially affect ambient levels of CO at the project intersections analyzed in the future Build conditions. Of the parking associated with the projected development sites, the prototypical parking garage proposed for the south side of Willoughby Street, between Albee Square West/Gold Street and Duffield Street was modeled. The modeled garage represents the potential worst case impacts based on its capacity and location adjacent to the Willoughby Street and Gold Street intersection. With a parking capacity of approximately 694 spaces, this proposed garage would accommodate the parking demand from the proposed development sites O, P, and Q (as described in Chapter 1, "Project Description"). Other parking garages associated with the proposed actions were not analyzed, since the size of these parking facilities and the traffic levels associated with them would be comparable or significantly smaller than with the parking garage being analyzed.

The exhaust from the garages' ventilation systems would contain elevated levels of CO due to emissions from vehicles using the garages. The exhaust could potentially affect ambient levels of CO at receptors near the proposed exhaust vents. An analysis was performed using the

methodology set forth in the *CEQR Technical Manual*, applying modeling techniques to the vent structures and calculating pollutant levels at various distances from the vents.

Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA-developed MOBILE6.2 mobile source emission model and an ambient temperature of 52.5°F. Other details regarding the model were described above. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking garages. In addition, all departing vehicles were assumed to idle for 1 minute before proceeding to the exit. The concentration of CO within the garage was calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of 1 cubic foot per minute of fresh air per gross square foot of garage area. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 8-hour average period. (No exceedances of the 1-hour standard would occur and the 8-hour values are the most critical for impact assessment.)

To determine pollutant levels in the vicinity of the vents, the exhaust from the garage was analyzed as a "virtual point source" using the methodology in EPA's Workbook of Atmospheric Dispersion Estimates, AP-26. This methodology estimates CO concentrations at various distances from the vents by assuming that the concentration in the garage is equal to the concentration leaving the exhaust, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent faces. Background concentrations are then added to the modeling results to obtain the total ambient levels. Cumulative impacts from on-street sources (from the nearest, modeled intersection–Site 3, Willoughby Street and Gold Street) and the garage exhaust were also analyzed.

## STATIONARY SOURCES

A stationary source analysis was conducted to evaluate potential impacts from the proposed actions' HVAC systems. In addition, an assessment was conducted to determine the potential for impacts due to industrial activities within the re-zoning area.

The *CEQR Technical Manual* also requires an assessment of any actions that could result in the location of residential developments within 1,000 feet of a large emission source (e.g., a power plant) or within 400 feet of commercial, institutional, or large-scale residential developments where the proposed structure would be of a height similar to or greater than the height of an existing emission stack. To assess the potential effects of these existing sources on the proposed actions, a review of existing permitted facilities was conducted. Within the 1,000 foot area around the rezoning area, "major" combustion-related facilities as well as proposed electrical generating facilities were considered. This included all existing facilities subject to federal Prevention of Significant Deterioration (PSD) regulations, existing electrical generating facilities, and proposed major electrical generating facilities and peaking facilities. Within the 400 foot study area boundary, other sources such as those permitted under NYSDEC's Title V program were considered. Sources of information reviewed included the following:

- Combustion permits provided by DEP;
- Emissions source databases provided by NYSDEC for all sources located within the study impact areas. The data was compiled by NYSDEC from the NYSDEC Source Management System (SMS) and Air Facility System (AFS) inventories;

- The EPA's Envirofacts[1] database; and
- The NYSDEC Title V permit Web site.

No existing or proposed major electrical generating facilities with a potential to impact air quality in and around the proposed actions were identified. One source was identified within the study areas defined above (111 Livingston Street) which has a Title V permit, however, its exhaust stacks are well above the maximum height of the projected residential developments. Therefore, impacts on the proposed actions from stationary sources are not a concern.

*HVAC ANALYSIS*

*$NO_2$, $PM_{10}$, and $SO_2$ Impacts*

Screening

To compare $NO_2$, $PM_{10}$, and $SO_2$ concentrations from the proposed actions with the national and state air quality standards, estimates of the maximum estimated concentrations must be prepared. Since the projected developments would not result in any major sources of stationary source emissions, a screening analysis was conducted. This procedure evaluates whether or not a detailed analysis using dispersion modeling is necessary.

To assess air quality impacts associated with emissions from heating and hot water systems, the methodology described in the *CEQR Technical Manual* was followed, which involves determining impacts from the project at the nearest building of equal or greater height. However, due to the number of proposed developments associated with the proposed actions, and their proximity to potential receptor sites as well as each other, cumulative effects also need to be considered.

Air Quality Appendix 8 of the *CEQR Technical Manual* outlines a procedure for determining potential cumulative impacts on a proposed project. It can also be used to determine cumulative impacts *from* a proposed action. The procedure involves identifying all sources with a potential impact on nearby elevated receptors; determining each projected development's emission rates; using the Industrial Source Complex model (ISC3) screening database for each averaging period of concern, to find the concentration based on the distance between each development and the existing receptor site (Table 3Q-3 of the *CEQR Technical Manual*); multiplying the emission rates from the values found in the table to calculate concentrations; and adding the concentrations to determine the maximum predicted cumulative impact. Emission rates were determined using the procedures in Air Quality Appendix 7 of the *CEQR Technical Manual*, which considers the building's development size, type of development and fuel(s) burned. The analysis considered both impacts on existing residential developments as well as on the proposed action's own projected development sites. To estimate the maximum expected total pollutant concentrations at a given receptor, the predicted levels were added to corresponding background concentrations.

[1] Website: http://oaspub.epa.gov/enviro/ef_home2.air.

Dispersion Modeling

*$NO_2$, $PM_{10}$, and $SO_2$ Impacts*

The screening analysis indicated that dispersion modeling would be required to assess the potential air quality impacts of stationary source emissions from the projected development site J on receptors at the proposed development site I(A), and from projected development site BB on receptors at the proposed development site AA (Project-on-Project analyses). These potential impacts were evaluated using the Industrial Source Complex Short Term (ISCST3) dispersion model developed by EPA, and described in *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models* (EPA-454/B-95-003a). The ISCST3 model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability of calculating pollutant concentrations at locations when the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. Computations with the ISCST3 model to determine impacts from exhaust stacks were made assuming stack tip downwash, buoyancy-induced dispersion, gradual plume rise, urban dispersion coefficients and wind profile exponents, no collapsing of stable stability classes, and elimination of calms. ISCST3 was run with and without the building downwash algorithms enabled. The meteorological data set consisted of the latest 5 years of concurrent meteorological data that are available: surface data collected at La Guardia Airport (1997-2001) and upper air data collected at Brookhaven, New York (1997-2001).

*Receptor Locations*. Discrete receptors (i.e., locations with operable windows) on the projected development sites were developed for the stationary source modeling analysis. The receptor network consisted of receptors located along the sides and roof of the two proposed development sites being analyzed. Rows of receptors were placed at spaced intervals on the buildings at multiple elevations. The modeling analysis was based upon bulk configurations that illustrate the development that could be created on the project sites that have been identified as part of the worst-case development scenario. Accordingly, receptors were located assuming the proposed building envelopes shown in Figures 1-9 through 1-12 of Chapter 1, "Project Description."

*Emission Estimates and Stack Parameters*. Fuel estimates for the modeled development sites were estimated based on procedures outlined in the *CEQR Technical Manual* as discussed above. Using worst-case assumptions, potential fuel usage was estimated assuming No. 6 fuel oil for $SO_2$ and PM, and natural gas for $NO_2$.

Emission factors from the fuel oil and natural gas Combustion sections of EPA's AP-42 were utilized to determine emission rates for the proposed development site's heating and hot water systems (see Table 16-3). The annual average $NO_2$ impacts from the proposed actions conservatively assumed all of the nitrogen oxides emitted by these operations were $NO_2$.

*Background Concentrations*. To estimate the maximum expected total pollutant concentrations at a given receptor, the predicted levels were added to corresponding background concentrations. The background levels were based on concentrations monitored at the nearest NYSDEC ambient air monitoring station. The measured background concentration was added to the predicted contribution from the modeled source to determine the maximum predicted total pollutant concentration. This analysis assumes that the maximum background concentrations occur on all days.

**Table 16-3**
**Stack Parameter and Emission Rate Data for Proposed Development Sites**

| Parameter | Value | |
|---|---|---|
| | Site J | Site BB |
| Stack Height | 114 feet* | 193 feet* |
| Stack Diameter | 0 feet** | 0 feet** |
| Stack Exit Velocity | 0.00328 feet/second** | 0.00328 feet/second** |
| Stack Exit Temperature | 68 °F** | 68 °F** |
| $SO_2$ Emission Rate (Short-term/Annual) | 2.57 lbs per hr / 0.71 lbs per hr | 1.55 lbs per hr / 0.42 lbs per hr |
| $NO_x$ Emission Rate | 0.21 lbs/hr | 0.13 lbs/hr |
| $PM_{10}$ Emission Rate (Short-term/Annual) | 0.55 lbs/hr / 0.15 lbs per hr | 0.33 lbs/hr / 0.087 lbs per hr |

**Notes:**
* Assumes a 3-foot stack above the building roof as per *CEQR Technical Manual* Guidance.
** Worst-case assumptions per *CEQR Technical Manual* Guidance.

*$PM_{2.5}$ Impacts*

Dispersion modeling was performed to assess the impacts of the particulate matter emitted from the proposed action on ambient $PM_{2.5}$ concentrations in the defined study areas. The methodology follows the general approaches that were performed for the $PM_{10}$ impacts from the sources analyzed in the refined dispersion modeling analysis presented above. The assessment of $PM_{2.5}$ impacts from the projected developments of most concern (i.e., BB and J) is reasonable since that analysis considered the sources which resulted in the worst-case $PM_{10}$ impacts, and are therefore appropriate indicators for assessing overall $PM_{2.5}$ impacts from the proposed action. However, since the interim guidance criteria for $PM_{2.5}$ are based on incremental changes for both localized and neighborhood scale assessments, the modeling was performed to estimate the maximum predicted changes in $PM_{2.5}$ concentrations so the results could be compared to these criteria.

The $PM_{2.5}$ modeling impact assessment employed the same EPA dispersion model that was employed in the modeling of the other criteria pollutants, i.e., the ISCST3 model. Hourly meteorological data measured at the LaGuardia Airport station during the years 1997 through 2001 were also employed in this analysis.

The $PM_{10}$ emission factors described in Table 16-3 were used. However, if the initial modeling results exceeded the 24-hour interim guidance criteria, more realistic stack parameters were used in lieu of *CEQR Technical Manual* defaults since these are very conservative and may yield very high concentrations in situations where the receptors are in close proximity to the source.

The same network of receptors on each of the development sites was utilized for the "local" impact analyses (i.e., 24-hour $PM_{2.5}$ impacts). In the event that the maximum predicted incremental impacts of $PM_{2.5}$ exceeded 0.1 $\mu g/m^3$ on an annual average basis, an analysis to determine impacts on a neighborhood-scale basis was conducted. In accordance with the DEP interim guidance criteria for $PM_{2.5}$, a neighborhood scale concentration represents the average concentration over an area of approximately one square kilometer centered on the location where the maximum impact is predicted.

*INDUSTRIAL SOURCES*

*Screening*

To assess and estimate the potential effects on the proposed actions from existing industrial operations in the surrounding area, an investigation was conducted. A study area was established within 400 feet of the property boundary of each sensitive projected development site.

A request was made to DEP's Bureau of Environmental Compliance (BEC) to obtain all the available certificates of operation for sources of manufacturing or industrial emissions within the entire study area. In addition, a search of Federal- and State-permitted facilities within the study area was conducted using the EPA's Envirofacts database. Facilities which appeared in the Envirofacts database were cross-referenced against the DEP permits and the NYSDEC Air Guide-1 software emissions database, which presents a state-wide compilation of permit data for toxic air pollutants.

An air quality dispersion model screening database, ISC3, was used to estimate maximum potential impacts from different sources at various distances. Impact distances selected for each source were the minimum distances between the property boundary of the development sites and the source sites. Predicted worst-case impacts on the proposed development sites were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in the NYSDEC's DAR-1 AGC/SGC tables. These guideline concentrations present the airborne concentrations, which are applied as a screening threshold to determine if the future residents of the projected development sites could be significantly impacted from nearby sources of air pollution.

To assess the effects of multiple sources emitting the same pollutants, cumulative source impacts were determined. For each projected development, impacts of the same pollutant from industrial sources that were within 400 feet were combined and compared to the guideline concentrations discussed above.

*Dispersion Modeling*

The screening analysis indicated that dispersion modeling would be required to assess the potential air quality impacts of industrial source emissions from one of the businesses in the study area, a dry cleaning operation located near the proposed development sites I(A), G and J. These potential impacts were evaluated using the Industrial Source Complex Short Term (ISCST3) dispersion model, using the same modeling assumptions described above for the HVAC dispersion modeling analysis.

Discrete receptors (i.e., locations with operable windows) were placed on the potentially affected projected development sites for the stationary source modeling analysis. The receptor network consisted of receptors located along the sides of the buildings from the ground floor to the upper level. Receptors were placed at spaced intervals around the buildings at each floor level.

Emission estimates of the pollutants of concern were input into the ISCST3 dispersion model to estimate the impact on the projected development sites from the existing industrial source. Emission rates and stack parameters were obtained from the DEP permits.

# E. EXISTING CONDITIONS

## EXISTING MONITORED AIR QUALITY CONDITIONS

Monitored concentrations of CO, $SO_2$, particulate matter, $NO_2$, lead, and ozone ambient air quality data for the area are shown in Table 16-4.

**Table 16-4**
**Representative Monitored Ambient Air Quality Data**

| Pollutants | Location | Units | Period | Concentrations | | | Number of Exceedances of Federal Standard | |
|---|---|---|---|---|---|---|---|---|
| | | | | Mean | Highest | Second Highest | Primary | Secondary |
| CO | Canal Street | ppm | 8-hour | - | 3.7 | 3.0 | 0 | - |
| | | | 1-hour | - | 4.8 | 4.4 | 0 | - |
| $SO_2$ | Mabel Dean | ppm | Annual | 0.014 | - | - | 0 | - |
| | | | 24-hour | - | 0.046 | 0.045 | 0 | - |
| | | | 3-hour | - | 0.064 | 0.064 | - | 0 |
| Respirable Particulates ($PM_{10}$) | Mabel Dean | $\mu g/m^3$ | Annual | 19 | - | - | 0 | 0 |
| | | | 24-hour | - | 31 | 30 | 0 | 0 |
| $NO_2$ | Mabel Dean | ppm | Annual | 0.038 | - | - | 0 | 0 |
| Lead | Susan Wagner | $\mu g/m^3$ | 3-month | - | 0.02 | 0.02 | 0 | - |
| $O_3$ | Mabel Dean | ppm | 1-hour | - | 0.083 | 0.075 | 0 | 0 |

**Source:** 2001 Annual New York State Air Quality Report, NYSDEC July 2002.

These values are the most recent (2001) monitored data available that have been published by NYSDEC for these locations. There were no monitored violations of the NAAQS for the pollutants at these sites.

## PREDICTED EXISTING POLLUTANT CONCENTRATIONS IN THE PROJECT AREA

As noted previously, receptors were placed at multiple sidewalk locations next to the five intersections under analysis. The receptor with the highest predicted CO concentrations was used to represent these intersection sites for the existing conditions. CO concentrations were calculated for each receptor location, at each intersection, for each peak period specified above.

Table 16-5 shows the maximum predicted existing (2003) CO 8-hour average concentrations at these intersections. (No 1-hour values are shown since predicted values are much lower than the standard.) The values shown are the highest predicted concentrations for each receptor location for any time period analyzed. At all receptor sites, the maximum predicted 8-hour average concentrations do not exceed the national standard of 9 ppm.

**Table 16-5**
**Maximum Predicted Existing 8-Hour Average Carbon Monoxide Concentrations for 2003 (parts per million)**

| Receptor Site | Location | Time Period | 8-Hour Concentration* (ppm) |
|---|---|---|---|
| 1 | Tillary Street and Flatbush Avenue | AM | 6.0 |
| 2 | Myrtle Avenue and Flatbush Avenue | PM | 4.9 |
| 3 | Willoughby Street and Gold Street | PM | 3.8 |
| 4 | Livingston Street and Hoyt Street | PM | 3.4 |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | PM | 6.0 |

**Notes:** * CAL3QHCR Results
8-Hour NAAQS for CO is 9 ppm.

# F. THE FUTURE WITHOUT THE PROPOSED ACTIONS

## MOBILE SOURCES

*CO*

CO concentrations without the proposed actions were determined for the 2013 analysis year using the methodology previously described. Table 16-6 presents the future maximum predicted 8-hour average CO concentrations at the analysis intersections without the proposed actions (i.e., 2013 No Build values). The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed.

**Table 16-6**
**Maximum Future No Build Predicted 8-Hour Average Carbon Monoxide Concentrations for 2013 (parts per million)**

| Receptor Site | Location | Time Period | 8-Hour Concentration* (ppm) |
|---|---|---|---|
| 1 | Tillary Street and Flatbush Avenue | PM | 4.3 |
| 2 | Myrtle Avenue and Flatbush Avenue | PM | 3.6 |
| 3 | Willoughby Street and Gold Street | PM | 3.0 |
| 4 | Livingston Street and Hoyt Street | PM | 3.1 |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | PM | 4.7 |

**Notes:** * CAL3QHCR Results
8-Hour NAAQS for CO is 9 ppm.

Compared to the values shown in Table 16-5, predicted No Build values are lower than Existing Conditions. The decrease in CO concentrations primarily reflects the increasing proportion of newer vehicles with more effective pollution controls, as well as the continuing benefits of the New York State inspection and maintenance program.

*$PM_{10}$*

$PM_{10}$ concentrations without the proposed actions were determined for the 2013 analysis year using the methodology previously described. Table 16-7, presents the future maximum predicted 24-hour and annual average $PM_{10}$ concentrations at the analysis intersection without the proposed actions (i.e., 2013 No Build values). The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed. The No Build concentration includes existing $PM_{10}$ background levels, since future $PM_{10}$ background levels are generally considered to be the same as existing levels.

**Table 16-7**
**Maximum Future No Build Predicted 24-Hour and Annual Average $PM_{10}$ Concentrations for 2013 ($\mu g/m^3$)**

| Receptor Site | Location | 24-Hour Concentration* ($\mu g/m^3$) | Annual Average Concentration* ($\mu g/m^3$) |
|---|---|---|---|
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | 117.8 | 44.6 |

**Notes:** * CAL3QHCR Results
24-Hour NAAQS for $PM_{10}$ is 150 $\mu g/m^3$.
Annual Average NAAQS for $PM_{10}$ is 50 $\mu g/m^3$.

$PM_{2.5}$ concentrations without the proposed actions are not presented since predicted future $PM_{2.5}$ background levels are generally considered to be the same as existing levels.

## G. THE FUTURE WITH THE PROPOSED ACTIONS

The proposed actions would result in increased mobile source emissions on streets within and surrounding the rezoning area. The proposed actions could also affect the surrounding community by emissions from HVAC equipment. The following sections describe the results of the studies performed to analyze the potential impacts on the surrounding community from these sources. In addition, existing industrial facilities were assessed for potential adverse impacts on the future occupants of the proposed development sites. The areas of concern are discussed below.

### MOBILE SOURCES

*CO*

CO concentrations with the proposed actions were determined for the 2013 analysis year using the methodology previously described. Table 16-8 shows the future maximum predicted 8-hour average CO concentration with the proposed actions at the five intersections studied. (No 1-hour values are shown since no exceedances of the standard would occur and the *de minimis* criteria are only applicable to 8-hour concentrations. Therefore, the 8-hour values are the most critical for impact assessment.) The values shown are the highest predicted concentrations for any of time periods analyzed. The results indicate that the proposed actions would not result in any violations of the CO standard or any significant impacts at the receptor locations.

**Table 16-8**
**Maximum Future Build Predicted 8-Hour Average Carbon Monoxide Concentrations for 2013 (parts per million)**

| Receptor Site | Location | Time Period | 8-Hour Concentration (ppm)* | |
|---|---|---|---|---|
| | | | No Build | Build |
| 1 | Tillary Street and Flatbush Avenue | PM | 4.3 | 4.5 |
| 2 | Myrtle Avenue and Flatbush Avenue | PM | 3.6 | 3.6 |
| 3 | Willoughby Street and Gold Street | PM | 3.0 | 3.5 |
| 4 | Livingston Street and Hoyt Street | PM | 3.1 | 3.2 |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | PM | 4.7 | 4.8 |

**Notes:** * CAL3QHCR Results
8-Hour NAAQS for CO is 9 ppm.

*$PM_{10}$*

$PM_{10}$ concentrations with the proposed actions were determined for the 2013 analysis year using the methodology previously described. Tables 16-9 and 16-10 show the future maximum predicted 24-hour and annual average $PM_{10}$ concentrations with the proposed actions at the intersection studied. The values shown are the highest predicted concentrations for any of time periods analyzed. The results indicate that the proposed actions would not result in any violations of the $PM_{10}$ standard or any significant impacts at the receptor locations.

**Table 16-9**
**Maximum Future Build Predicted 24-Hour Average $PM_{10}$ Concentrations for 2013 ($\mu g/m^3$)**

| Receptor Site | Location | 24-Hour Concentration ($\mu g/m^3$)* | |
|---|---|---|---|
| | | No Build | Build |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | 117.8 | 121.1 |

**Notes:** * CAL3QHCR Results
24-Hour NAAQS for $PM_{10}$ is 150 $\mu g/m^3$.

**Table 16-10**
**Maximum Future Build Predicted Annual Average $PM_{10}$ Concentrations for 2013 ($\mu g/m^3$)**

| Receptor Site | Location | Annual Average Concentration ($\mu g/m^3$)* | |
|---|---|---|---|
| | | No Build | Build |
| 5 | Atlantic Ave./Flatbush Ave./4th Ave. | 44.6 | 45.6 |

**Notes:** * CAL3QHCR Results
Annual Average NAAQS for $PM_{10}$ is 50 $\mu g/m^3$.

*$PM_{2.5}$*

As mentioned above, the primary focus of the mobile source $PM_{2.5}$ analysis was to determine the maximum predicted incremental impacts, so that they could be compared to the interim guidance criteria that would determine the potential significance of the project's impacts.

The maximum predicted neighborhood-scale annual average and localized 24-hour average $PM_{2.5}$ incremental concentrations, are presented in Table 16-11. The results show that the

predicted annual and daily (24-hour) $PM_{2.5}$ increments are below the interim guidance criteria, and therefore the proposed actions would not result in significant $PM_{2.5}$ impacts at the analyzed receptor location.

**Table 16-11**
**Maximum Predicted Incremental 24-Hour and Annual Average $PM_{2.5}$ Concentrations for 2013 ($\mu g/m^3$)**

| Receptor Site | Location | Neighborhood-Scale Analysis | Localized Analysis |
|---|---|---|---|
| | | Annual Increase | 24-Hour Increase |
| 3 | Willoughby Street and Gold Street | 0.03 | 0.72 |

Notes: $PM_{2.5}$ Interim Guidance Criteria:
Annual Average (Neighborhood-Scale)—0.1$\mu g/m^3$
24-Hour (Localized)—5.0 $\mu g/m^3$

## PARKING

As previously discussed, an analysis was performed to assess the potential effects on ambient CO concentrations from emissions from parking garages at the proposed development sites. The prototypical parking garage proposed for the south side of Willoughby Street, between Albee Square West/Gold Street and Duffield Street was modeled as a worst-case parking facility for this analysis. The garage was modeled as a mechanically ventilated, below-grade garage with a parking space capacity of approximately 694 spaces. The average 8-hour concentrations were determined using the weekday 8-hour time period when overall garage usage would be the greatest, which would typically be when the greatest number of vehicles would exit the facility over an 8-hour period. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Since the EIS analyzes a worst-case development scenario and not specific development proposals, there are no specific garage designs upon which the modeling of emissions can be based. Therefore, worst-case assumptions were made regarding the design of the garages' mechanical ventilation systems. An 8-hour persistence factor of 0.81 was used to account for meteorological variability over the average 8-hour period.

Based on the methodology previously discussed, the maximum predicted future CO concentrations, with ambient background levels, at sidewalk receptor locations would be 11.0 ppm and 4.8 ppm for the 1- and 8-hour periods, respectively. The maximum 1- and 8-hour contributions from the parking garage would be 5.0 ppm and 2.5 ppm, respectively. The values are the highest predicted concentrations for any time period analyzed. These maximum predicted CO levels would be below the applicable CO standard.

In addition, the maximum total cumulative CO levels at Receptor Site 3, including parking garage emissions and on-street emissions, were evaluated. Cumulative emissions were assessed at this receptor sites because the parking garage modeled is closest to this intersection, and is, therefore, the worst case. For 2013, the maximum cumulative 8-hour average concentrations at Site 3 would be 4.8 ppm with ambient background levels included, for the PM time period. This resulting cumulative CO concentration is less than the 8-hour ambient air quality standard, and is not predicted to be over the *de minimis* criteria.

## STATIONARY SOURCES

The proposed development sites were evaluated for their potential effects on the surrounding community due to the emissions from the developments' HVAC systems. Existing industrial facilities were assessed for potential adverse impacts on the future developments sites' residents. Potential impacts were analyzed for emissions from existing or planned nearby sources. The areas of concern are discussed below.

### *HVAC ANALYSIS*

The primary stationary source of air pollutants associated with the proposed actions would be the emissions from the natural gas or oil-fired HVAC systems. The primary pollutant of concern when burning natural gas is nitrogen dioxide, and when burning oil, sulfur dioxide. Based on the methodologies in the *CEQR Technical Manual*, an estimate of the emissions from each development's HVAC system was made based on the development size, type of fuel used and type of construction.

The proposed actions would result in the development of commercial, cultural and mixed-use residential uses that are typically found throughout the City. Currently, the project consists only of zoning envelopes, not discrete design programs.

#### *Screening*

*Impacts from Projected Development Sites on Existing Sensitive Uses.* Impacts were determined using the ISC3 screening database found in Table 3Q-3 of the *CEQR Technical Manual.* If multiple sources within 400 feet of a receptor site were found of a similar or greater height than the source, the maximum predicted impacts were combined.

The maximum predicted concentrations from the modeling were added to the background concentrations to estimate the ambient air quality at potential elevated receptor locations near the projected development sites. The results of this analysis are presented in Table 16-12. The table summarizes the maximum total concentrations at receptor locations that are within 400 feet of the projected development sites and of a similar or greater height (as determined by number of boiling stories). As shown in the table, the maximum total pollutant concentrations for all of the pollutant time averaging periods are less than their respective standards. The results of this analysis show that there would be no significant air quality impacts from the projected development sites' HVAC systems on existing sensitive uses in the project area.

*Impacts from Projected Development Sites on Other Projected Development Sites.* A separate analysis was conducted to determine the potential impacts on the proposed action from one or more development sites to another development site. The same procedure for determining impacts on the surrounding area was used. The estimated concentrations from the modeling were added to the background concentrations to estimate total air quality concentrations at each proposed projected development site. The analysis showed that emissions from the projected development site J (186-136 Myrtle Avenue) would have the potential to result in impacts on the adjacent projected development site I (158-180 Myrtle Avenue). In addition, the emissions from the projected development site BB (258-272 Livingston Street) would have the potential to result in impacts on projected development site AA (230-238 Livingston Street). Therefore, ISCST3 analysis was conducted to assess the potential for impacts from the projected development sites. The results of this analysis are discussed and presented below.

**Table 16-12**
**Summary of HVAC Screening Pollutant Concentrations—Impacts from Projected Development Sites on Existing Sensitive Uses ($\mu g/m^3$)**

| Pollutant | Averaging Period | Background Concentration ($\mu g/m^3$) | Predicted Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) | Ambient Standard ($\mu g/m^3$) |
|---|---|---|---|---|---|
| **Receptor R1 (175 Willoughby Street), Source J** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 1.2 | 72.2 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 851.5 | 1,063.5 | 1,300 |
| | 24-hour | 118 | 144.9 | 262.9 | 365 |
| | Annual | 37 | 4.1 | 41.1 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 30.8 | 79.8 | 150 |
| | Annual | 22 | 0.9 | 22.9 | 50 |
| **Receptor R2 (191 Willoughby Street), Source J** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 1.0 | 72.0 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 646.5 | 858.5 | 1,300 |
| | 24-hour | 118 | 113.0 | 231.0 | 365 |
| | Annual | 37 | 3.3 | 40.3 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 23.0 | 72.0 | 150 |
| | Annual | 22 | 0.7 | 22.7 | 50 |
| **Receptor R3 (22 Ashland Place), Source J** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 1.12 | 71.12 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 765.0 | 977.0 | 1,300 |
| | 24-hour | 118 | 132.0 | 250.0 | 365 |
| | Annual | 37 | 3.78 | 40.78 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 28.0 | 77.0 | 150 |
| | Annual | 22 | 0.80 | 22.80 | 50 |
| **Receptor I1 (6 Nevins Street), Source J** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 0.52 | 71.52 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 345.7 | 557.7 | 1,300 |
| | 24-hour | 118 | 61.4 | 179.4 | 365 |
| | Annual | 37 | 1.8 | 38.8 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 13.0 | 62.0 | 150 |
| | Annual | 22 | 0.4 | 22.4 | 50 |
| **Receptor I2 (38 Lafayette Avenue), Source EE** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 1.1 | 72.1 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 708.0 | 920.0 | 1,300 |
| | 24-hour | 118 | 123.7 | 241.7 | 365 |
| | Annual | 37 | 3.6 | 40.6 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 26.3 | 75.3 | 150 |
| | Annual | 22 | 0.8 | 22.8 | 50 |

*Dispersion Modeling*

$NO_2$, $PM_{10}$, and $SO_2$ Impacts

Potential stationary source impacts from the HVAC systems of the projected development site J on the adjacent projected development site I, and projected development site BB on projected development site AA, were analyzed using ISCST3 modeling, based on the methodology previously described. The estimated concentrations from the modeling were added to the

background concentration to estimate ambient air quality at the projected development sites. The results of this analysis are presented in Table 16-13. As shown in the table, the maximum predicted concentrations for the pollutants analyzed are below the respective standards. Therefore, no significant adverse air quality impacts would occur from the HVAC systems of the projected development sites for these pollutants.

**Table 16-13**
**HVAC Dispersion Modeling Analysis**
**Maximum Predicted Pollutant Concentrations**

| Pollutants | Averaging Period | Background Concentration ($ug/m^3$) | Predicted Concentration ($ug/m^3$) | Total Predicted Concentration ($ug/m^3$) | Ambient Standard ($ug/m^3$) |
|---|---|---|---|---|---|
| **Receptor I, Source J** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 0.2 | 71.2 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 148.1 | 360.1 | 1,300 |
| | 24-hour | 118 | 39.9 | 157.9 | 365 |
| | Annual | 37 | 0.8 | 37.8 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 8.5 | 57.5 | 150 |
| | Annual | 22 | 0.2 | 22.2 | 50 |
| **Receptor AA, Source BB** | | | | | |
| Nitrogen Dioxide ($NO_2$) | Annual | 71 | 0.9 | 71.9 | 100 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 212 | 659.2 | 871.2 | 1,300 |
| | 24-hour | 118 | 121.7 | 239.7 | 365 |
| | Annual | 37 | 2.9 | 39.9 | 80 |
| Inhalable Particulates ($PM_{10}$) | 24-hour | 49 | 25.6 | 74.6 | 150 |
| | Annual | 22 | 0.6 | 22.6 | 50 |

$PM_{2.5}$ Impacts

*Maximum Local $PM_{2.5}$ Incremental Impacts*

The air quality modeling analysis determined the highest predicted increase in 24-hour and annual average $PM_{2.5}$ concentrations from the two development sites. Table 16-14 summarizes the results of the impacts compared to the appropriate interim guidance criteria.

**Table 16-14**
**Maximum Predicted Stationary Source**
**$PM_{2.5}$ Incremental Concentrations**

| Receptor, Source | Averaging Period | Maximum Increment($\mu g/m^3$) | Significant Impact Threshold ($\mu g/m^3$) |
|---|---|---|---|
| Receptor I, Source J | 24-hour | 4.83 | 5.0 |
| | Annual | 0.15 | 0.3 |
| Receptor AA, Source BB | 24-hour | < 5.0 | 5.0 |
| | Annual | 0.09 | 0.3 |

**Note:** [1] Annual results represent the maximum impacts at individual receptor locations.

As shown in the table, for projected development site J, the maximum 24-hour incremental impacts would be less than the applicable interim guidance criterion of 5 $\mu g/m^3$. On an annual basis, impacts the projected $PM_{2.5}$ impacts would be less than the NYSDEC policy threshold of 0.3 $\mu g/m^3$. For projected development site BB, the maximum predicted incremental $PM_{2.5}$ impact was predicted to be slightly higher than the 5 $\mu g/m^3$ interim guidance criterion. On an annual basis, the maximum predicted impact would not exceed the 0.3 $\mu g/m^3$ threshold. Therefore, to ensure that impacts do not exceed the 24-hour $PM_{2.5}$ interim guidance criterion of 5 $\mu g/m^3$, the minimum distance from the HVAC stack(s) to the receptors at projected development site AA must be located at least 115 feet from the lot line facing Hoyt Street and parallel with Schermerhorn Street. An (E) designation would be incorporated into the zoning proposal which would preclude the potential for air quality impacts at this projected development site.

The text of the (E) designation is as follows:

> Block 165, Lot 29 (site BB)
>
> Any new residential and/or commercial development on the above-referenced property must ensure that the heating, ventilating and air conditioning stack(s) is located at least 115 feet from the lot line facing Hoyt Street and parallel with Schermerhorn Street.

Neighborhood-Scale Annual Average Impact Assessment

As shown in Table 16-14, the maximum annual impact from projected development site J on projected development site I is 0.15 $\mu g/m^3$.This concentration slightly exceeds the DEP interim guidance criterion of 0.1$\mu g/m^3$. Therefore, an analysis was conducted to determine the neighborhood-scale annual $PM_{2.5}$ increment to allow a direct comparison with this threshold concentration. The resulting neighborhood-scale annual average impact was 0.02 $\mu g/m^3$, which is well below the interim guidance criteria. Consequently, no significant adverse air quality impacts are predicted to occur on neighborhood-scale receptors from this site.

For projected development site BB, the maximum predicted local impact was 0.09 $\mu g/m^3$, which is less than the interim guidance threshold of 0.1 $\mu g/m^3$. Therefore, a neighborhood-scale analysis was not required for this site.

*INDUSTRIAL SOURCES*

*Screening*

As discussed above, a study was conducted to identify manufacturing and industrial uses within 400 feet of the projected development sites. DEP-BEC and EPA permit databases were used to identify existing sources of industrial emissions. A total of five permitted facilities were identified within 400 feet of the projected residential development sites. Figure 16-2 shows the locations of each identified source. Table 16-15 shows the businesses' name and address and a description of each permitted industrial sources.

**Table 16-15**
**Business with Industrial Source Permits**

| Source Reference No. | Facility Name | Address | Description of Permitted Sources |
|---|---|---|---|
| 1 | Medtech Motors Inc. | 329 Gold Street | Exhaust System |
| 2 | R&P Cleaners | 167 Myrtle Avenue | Dry Cleaning |
| 3 | Bridge Cleaners | 384 Bridge Street | Dry Cleaning |
| 4 | Abraham and Straus Department Store | 420 Fulton Street | Paint Spray Booth |
| 5 | Action Press | 170 Tillary Street | Printing |

The screening procedure used to estimate the emissions from these businesses is based on information contained in the operational permits obtained from BEC and NYSDEC. The permits issued by BEC describe potential contaminants emitted by the permitted processes, hours per day and days per year in which there may be emissions (which is related to the hours of business operation), and the characteristics of the emission exhaust systems (temperature, exhaust velocity, height, and dimensions of exhaust.) The Air Guide-1 software program contains information on sources permitted by NYSDEC. It summarizes short-term and annual emissions by pollutant and facility.

This screening analysis identified one business that could potentially have significant impacts on one of the projected residential development sites. This business is R&P Cleaners, a dry cleaning establishment at 167 Myrtle Avenue, located near the projected development sites I(A), G, and J.

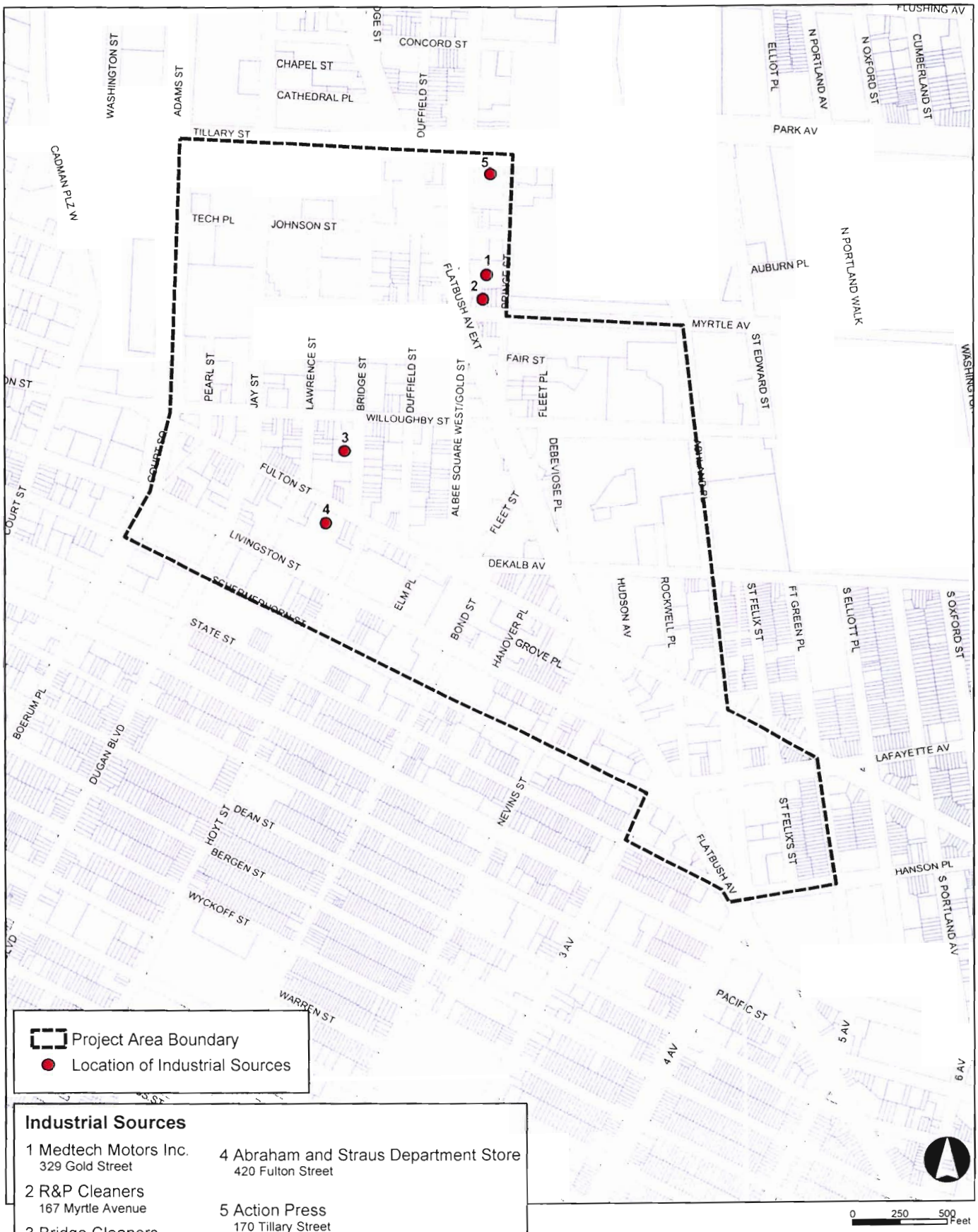
*Dispersion Modeling*

As a result of the potential impacts predicted from the initial industrial source screening analysis, a detailed analysis of industrial source impacts was undertaken to analyze potential impacts on the proposed development sites, following the methodology previously described.

Table 16-16 presents the potential impacts from the industrial screening and detailed modeling, at the projected developments most affected by industrial sources. The table lists the highest calculated SGC and AGC calculated for each toxic air pollutant. The conservative screening procedure and detailed analyses used to estimate maximum potential impacts from these businesses showed their operations would not result in any predicted violations of the NAAQS or any exceedances of the recommended SGC or AGC. Therefore, based on the data available on the surrounding industrial uses, the proposed developments would not experience significant air quality impacts from these facilities.

## CONSISTENCY WITH NEW YORK STATE AIR QUALITY IMPLEMENTATION PLAN

Maximum predicted pollutant concentrations with the proposed actions would be less than the corresponding ambient air standards. Therefore, the proposed actions would be consistent with the New York State Implementation Plan for the control of ozone and CO.




**Industrial Sources**

1 Medtech Motors Inc.
329 Gold Street

2 R&P Cleaners
167 Myrtle Avenue

3 Bridge Cleaners
384 Bridge Street

4 Abraham and Straus Department Store
420 Fulton Street

5 Action Press
170 Tillary Street



**Industrial Sources**
Figure 16-2

**Table 16-16**
**Industrial Source Analysis**

| Number | Name of Business | Address | Type of Business | Pollutant | Hours of Operation | | Estimated Short-term Impact (ug/m3) | SGC (ug/m3) | Estimated Long-term Impact (ug/m3) | AGC (ug/m3) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | hrs/day | days/yr | | | | | |
| **Site G** | | | | | | | | | | | |
| 1 | MEDTECH MOTORS,INC. | 329 Gold St. | Automobile | CARBON MONOXIDE | 7.5 | 300 | 16946 | 40,000.0 | 63.33 | -- | a |
| | | | | HYDROCARBONS C1-3 | 7.5 | 300 | 9901.0 | -- | 36.96 | -- | b |
| | | | | OXIDES OF NITROGEN | 7.5 | 300 | 151114.0 | -- | 8.72 | -- | b |
| 2 | R&P CLEANERS | 167 Myrtle Ave. | Dry Cleaner | PERCHLOROETHYLENE | 5.0 | 300 | 216.7 | 1,000.0 | 0.45 | 1.0 | b,c |
| 5 | ACTION PRESS | 170 Tillary St. | Printing | ISOPROPYL ALCOHOL | 8.0 | 240 | 2.8 | 120,000.0 | 0.01 | 7,000.0 | b |
| | | | | ETHYLENE GLYCOL | 8.0 | 240 | 1.0 | 10,000.0 | 0.004 | 400.0 | b |
| | | | | ETHYLENGLYCOLMONBUTY | 8.0 | 240 | 3.0 | 14,000.0 | 0.01 | 230.0 | b |
| | | | | OIL MIST | 8.0 | 240 | 5.7 | -- | 0.02 | -- | b |
| **Site I** | | | | | | | | | | | |
| 1 | MEDTECH MOTORS,INC. | 329 Gold St. | Automobile | CARBON MONOXIDE | 7.5 | 300 | 597 | 40,000.0 | 2.23 | -- | a |
| | | | | HYDROCARBONS C1-3 | 7.5 | 300 | 349.0 | -- | 1.30 | -- | b |
| | | | | OXIDES OF NITROGEN | 7.5 | 300 | 81.9 | -- | 0.31 | -- | b |
| 2 | R&P CLEANERS | 167 Myrtle Ave. | Dry Cleaner | PERCHLOROETHYLENE | 5.0 | 300 | 685.96 | 1,000.0 | 0.92 | 1.0 | b,c |
| **Site J** | | | | | | | | | | | |
| 1 | MEDTECH MOTORS,INC. | 329 Gold St. | Automobile | CARBON MONOXIDE | 7.5 | 300 | 213 | 40,000.0 | 0.92 | -- | a |
| | | | | HYDROCARBONS C1-3 | 7.5 | 300 | 124.4 | -- | 0.54 | -- | b |
| | | | | OXIDES OF NITROGEN | 7.5 | 300 | 29.2 | -- | 0.13 | -- | b |
| 2 | R&P CLEANERS | 167 Myrtle Ave. | Dry Cleaner | PERCHLOROETHYLENE | 5.0 | 300 | 137.9 | 1,000.0 | 0.40 | 1.0 | b,c |

**Table 16-16 (cont'd)**
**Industrial Source Analysis**

| Number | Name of Business | Address | Type of Business | Pollutant | Hours of Operation | | Estimated Short-term Impact (ug/m3) | SGC (ug/m3) | Estimated Long-term Impact (ug/m3) | AGC (ug/m3) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | hrs/day | days/yr | | | | | |
| **Site P** | | | | | | | | | | | |
| 3 | BRIDGE CLEANERS | 384 Bridge St. | Dry Cleaner | PERCHLOROETHYLENE | 8.0 | 253 | 201.5 | 1,000.0 | 0.72 | 1.0 | b |
| **Flatbush Triangle** | | | | | | | | | | | |
| 5 | ACTION PRESS | 170 Tillary St. | Printing | ISOPROPYL ALCOHOL | 8.0 | 240 | 2.8 | 120,000.0 | 0.01 | 7,000.0 | b |
| | | | | ETHYLENE GLYCOL | 8.0 | 240 | 1.0 | 10,000.0 | 0.00 | 400.0 | b |
| | | | | ETHYLENGLYCOLMONBUTY | 8.0 | 240 | 3.0 | 14,000.0 | 0.01 | 230.0 | b |
| | | | | OIL MIST | 8.0 | 240 | 5.6 | -- | 0.02 | -- | b |
| **Open Space on Jay Street** | | | | | | | | | | | |
| 4 | ABRAHAM AND STRAUS DEPT STORE | 420 Fulton St. | Display Repair Shop | ISOBUTYL ALCOHOL | 1.0 | 200 | 191.6 | -- | 0.08 | 360.0 | b |
| | | | | PARTICULATE | 1.0 | 200 | 1.8 | 380.0 | 0.00 | 50.0 | b |

**Notes:** a) 1-hour NAAQS
b) NYS DAR-1 (Air Guide-1) AGC/SGC Tables
c) Impacts extracted form detailed modeling analysis.

Site numbers correspond to Figure 16-2

## H. CONCLUSIONS

The results discussed below show that the maximum predicted carbon monoxide (CO), and particulate matter ($PM_{10}$ and $PM_{2.5}$) concentrations from mobile sources would be less than the corresponding ambient air standards, with the development of the projected development sites under the proposed actions. The cumulative parking garage analysis also determined that the project's public parking facilities would not result in any significant adverse air quality impacts.

A stationary source screening analysis and subsequent detailed dispersion modeling determined that there would be no potential significant adverse air quality impacts from emission of nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$) and $PM_{10}$, from the proposed HVAC systems of the projected development sites. With respect to $PM_{2.5}$,an E-designation has been placed on projected development site BB (Block 165, Lot 29), which stipulates that any new residential development and/or commercial development on the above-referenced and air conditioning stack(s) is located at least 115 feet from the lot line facing Hoyt Street and parallel with Schermerhorn Street, to avoid any potential significant air quality impacts. In addition, there would be no significant adverse air quality impacts from industrial facilities on the proposed developments sites. ✷